

PATENT CLAIMS

1. Device for photometric measurement of concentration of a chemical substance in a solution, comprising:

a lamp (1), which emits electromagnetic radiation in a predetermined wavelength range;

a first receiving unit (6) in a measuring branch (MB), which receives the radiation transmitted through the solution at a first wavelength;

a second receiving unit (7) in a reference branch (RB), which receives the radiation transmitted through the solution at a second wavelength; and

a control/evaluation unit (8), which, depending on the conditions present at the measuring site, uses the intensity values determined either by the measurement branch (MB) or by the reference branch (RB), in order to control the intensity of the radiation emitted by the lamp, such that the measured values made available are highly plausible.

2. Device as claimed in claim 1,

wherein the first receiving unit (6) and the second receiving unit (7) are UV-detectors.

3. Device as claimed in claim 1 or 2,

wherein the control/evaluation unit (8) controls in such a way that at least one of the two intensity values, measured in the measuring branch (MB) or in the reference branch (RB), lies within the reliable measuring range of the respective receiving unit (6; 7).

4. Device as claimed in claim 1 or 2,

wherein, in the case of a high concentration of the substance in the solution, the control/evaluation unit (8) uses the intensity value obtained in the reference branch (RB) to control the intensity of the lamp (1), and

wherein, in the case of a low concentration of the substance in the solution, the control/evaluation unit (8) uses the intensity value obtained in the measuring branch (MB) to control the intensity of the lamp (1).

5. Device as claimed in claim 3 or 4,

wherein the control/evaluation unit (8) checks, in a first method step, whether one of the two intensity values – that is, the intensity value measured in the reference branch (RB) or that in the measuring branch (MB) – is at least as great as a predetermined maximum intensity value ($I_{\max 1}$).

6. Device as claimed in claim 4,

wherein the control/evaluation unit (8) subsequently checks whether the intensity value measured in the reference branch (RB) is greater than the predetermined maximum intensity value ($I_{\max 1}$), and

wherein, in the case that the intensity value measured in the reference branch (RB) is greater than the predetermined maximum intensity value ($I_{\max 1}$), the control/evaluation unit (8) reduces the intensity of the lamp (1) successively in predetermined steps, until the intensity value measured in the reference branch (RB) is smaller than the predetermined maximum intensity value ($I_{\max 1}$).

7. Device as claimed in claim 5,

wherein, in the case that neither the intensity value measured in the reference branch (RB) nor that in the measuring branch (MB) is at least as great as the predetermined maximum intensity value ($I_{\max 1}$), the control/evaluation unit (8) increases the intensity of the lamp (1),

wherein the control/evaluation unit (8) subsequently checks whether the intensity value measured in the reference branch (RB) is greater than the predetermined maximum intensity value ($I_{\max 1}$), and

wherein, in the case that the intensity value measured in the reference branch (RB) is greater than the predetermined maximum intensity value ($I_{\max 1}$), the control/evaluation unit (8) reduces the intensity of the lamp (1) successively in predetermined steps, until the intensity value measured in the reference branch (RB) is smaller than the predetermined maximum intensity value ($I_{\max 1}$).

8. Device as claimed in claim 1,

wherein the lamp (1) is a flash lamp, preferably a xenon flash lamp.

9. Device as claimed in claim 8,

wherein, as energy storage, a first capacitor (14) is provided, by way of which the control/evaluation unit controls the intensity of the lamp (1).

10. Device as claimed in claim 8 or 9,
wherein a second capacitor (15) is provided, which the control/evaluation unit (8) adds to the first capacitor (14) in order to increase the intensity of the lamp (1).

11. Device as claimed in claim 1 or 3,
wherein the control of the intensity of the lamp (1) can be deactivated, and
wherein the control/evaluation unit (8) furnishes a measured value for the concentration of the substance in the solution, on the basis of the intensity values measured in the measuring branch (MB) and the reference branch (RB).

12. Device as claimed in claim 1, 3, or 11,
wherein the control/evaluation unit (8) subjects an obtained measured value to a plausibility check, in which the intensity values obtained in the measurement branch (MB) and the reference branch (RB) are checked for predetermined conditions, and
wherein the control/evaluation unit (8) assigns to an obtained measured value a disturbance variable found in the course of the plausibility check.

13. Device as claimed in claim 12,
wherein the control/evaluation unit (8) presents the measured value and the possibly present disturbance variable on a display (17).

14. Device as claimed in claim 11, 12, or 13,
wherein the control/evaluation unit (8) statistically determines a measured value based on a plurality of individual, measured values.